

The errata to be found in this book, especially in the lists of fossils, are rather too numerous. We may remark, too, that *Serpula*, *Vermilia*, and *Lignite* should not be classed under "Conchifera" (p. 33), nor *Pentacrinus*, *Serpula*, *Vermilia*, *Lignite*, *Selenite*, and *Septaria* be grouped as "Mollusca" (p. 31) by a professed naturalist like our author.

Mr. Damon has conscientiously given references to his authorities; but a revision of the numerous references to what he terms "Geol. Proc." would be desirable; for he confuses together the 'Geol. Proceedings' and the 'Geol. Journal,' and some are obviously incorrect.

It is a pity that the little map attached to this Handbook does not indicate the geological structure of the district. The author, it seems, expects his readers to have Sheet 17 of the Geological Survey Map of Great Britain always in hand when they consult his book. We would suggest that, in the next edition, Mr. Damon should add an illustration, with a fuller account, of the curious "fault" of the Ridgway, of which the railway makes a section at Upway. The author might also draw attention to the great mass of stony material in the Purbeck strata, due to the accumulation of multitudes of the tiny shells of Cypridæ—a fact of corresponding importance to the existence of rocks made up of equally minute Foraminifera, which he has noticed at pages 41 and 153.

The woodcuts in this little work are of superior execution, both as to drawing and engraving. The sections have evidently been prepared by practised surveyors. The plates in the 'Supplement,' nine in number, illustrative of Oolitic Fossils, have been drawn by one of the best of English palæontographers, Mr. C. B. Bone, and are elegant, truthful, and carefully finished. It is to be regretted that this 'Supplement' is of a larger size than the 'Handbook' itself; for they ought to be bound together.

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## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

June 12, 1860.—Dr. Gray, F.R.S., V.P., in the Chair.

DESCRIPTION OF A NEW SPECIES OF MANAKIN FROM NORTHERN BRAZIL. BY PHILIP LUTLEY SCLATER, M.A., SECRETARY TO THE SOCIETY.

Our Corresponding Member, M. Jules Verreaux, of Paris, has kindly sent to me for examination a specimen of a Manakin lately received by one of his correspondents from Para, which seems to belong to a different species from any heretofore described. Its nearest ally is certainly *Pipra flicauda* of Spix; but it is readily distinguishable from that and every other member of the group, with which I am acquainted, by the form of the tail-feathers. The outer rectrices are acuminate and produced; the second, third, and succeeding pairs in a less degree than the first; the outer pair exceeding the

medial rectrices, which have nearly the ordinary normal form, by nearly half an inch. In *P. flicauda*, as is well known, the rectrices are nearly of equal length, and terminate in a long hair-like filament. Further differences from *Pipra flicauda* are observable in the crimson colour descending lower down the back above, and pervading the breast and upper part of the belly. In the latter respect this species approaches to *P. aureola* and its scarcely separable ally, *P. flavicollis* of the Rio Negro, an example of which was in the same collection.

I propose to call this Manakin

*PIPRA HETERO CERCA*, sp. nov.

*Velutino-nigra*: dorso superiore pileoque toto cum nucha coccineis: fronte, ciliis oculorum et corpore subtus flavis, pectore coccineo perfuso: tectricibus subalaribus et macula in pogonio interiore remigum albis: caudæ rectricibus lateralibus elongatis, acuminatis, medias valde excedentibus: rostro plumbeo: pedibus obscure carneis.

Long. tota 4.25, alæ 2.5, caudæ rectricum lateralium 1.75, mediarum 1.3.

*Hab.* In ripis fl. Amazonum sup.

*Obs.* Affinis *P. flicaudæ* et *P. aureolæ*, sed caudæ forma primo visu distinguenda.

DESCRIPTION OF A NEW TYRANT-BIRD OF THE GENUS *ELAINEA*, FROM THE ISLAND OF SAINT THOMAS, WEST INDIES. BY PHILIP LUTLEY SCLATER, M.A., SECRETARY TO THE SOCIETY.

Mr. Osbert Salvin landed at St. Thomas for a few hours on his way out to Guatemala in the spring of last year, and with characteristic energy took out his gun for a ramble. The first shot fired secured two examples of a bird not previously known as an inhabitant of this island\*, and, I believe, new to science—a species of Tyrant-bird of the genus *Elainea*†. Mr. Riise, so well known for his collections in different branches of Natural History made in this island, having had his attention drawn to the existence of this bird by Mr. A. Newton, caused a search to be made, and obtained six other specimens, which I now exhibit. It is to this gentleman that I propose to dedicate this species, in commemoration of his exertions in confirming Mr. Salvin's discovery, by the name of

*ELAINEA RIISII*, sp. nov.

*Fuscescenti-olivacea*: pileo cristato intus albo: loris albescens: alis nigricantibus, primariis olivaceo stricte, secundariis et tectricibus flavicanti-albo latius marginatis: cauda nigricanti-fusca, marginibus externis olivacescentibus: subtus cine-

\* See Messrs. A. and E. Newton's articles on the Birds of St. Croix and St. Thomas in the 'Ibis,' 1859, pp. 59, 138, 252, 365.

† This genus of Sundevall has been written in many different ways (sc. *Elania*, *Elainia*, &c.); but the proper orthography is certainly *Elainea*, from ἐλαίνος or ἐλαίνεος, *oleagineus*.

*racescenti-alba, abdomine flavido lavato : rostro superiore obscure corneo, inferiore rubello : pedibus nigris.*

	Long. tota.	alæ.	caudæ.
Spec. <i>a</i> , ♂, 5·4		3·0	2·7
— <i>b</i> , ♀, 5·0		2·7	2·2
— <i>c</i> , ? 6·0		3·1	2·8
— <i>d</i> , 6·0		2·9	2·7
— <i>e</i> , 5·7		2·8	2·5
— <i>f</i> , 5·8		3·0	2·8
— <i>g</i> , 5·8		3·0	2·8

*Hab.* In ins. S. Thomæ Antillensium.

*Mus.* P. L. S.

*Obs.* Affinis *Elainea paganae* et ejusdem formæ, sed rostro longiore, compressiore, et corpore subtus pallidiore distinguenda.

I have specimens of two species of this genus of *Tyrannidæ* in my collection from Jamaica. One of them is *E. Cottæ* of Gosse; the other, as far as I know, undescribed, but quite different from the present. I have also an *Elainea* from Tobago, which I cannot refer strictly to any known species.

#### ON THE AFRICAN TRIONYCES WITH HIDDEN FEET (EMYDA).

BY DR. J. E. GRAY, F.R.S., V.P.Z.S.

Five species of my genus *Emyda* (which MM. Duméril and Bibron afterwards most unnecessarily named *Cryptopus*) have been described as found in Africa, viz.—

1. *Cryptopus senegalensis*, Dum. & Bib., from Senegal.
2. *Cyclanosteus Petersii*, Gray, from the Gambia.
3. *Cyclanosteus frenatus*, Peters, MSS., from Mozambique.
4. *Cryptopus Aubryi*, Duméril, from Gaboon.
5. *Aspidochelys Livingstonii*, Gray, from Mozambique.

Now it is very doubtful if several of these names are not synonymous, not because there is any doubt as to the distinctness of species, as some neophyte belonging to the Darwinian School might suspect, but simply because the materials on which they are founded do not afford us sufficient information or means of comparison.

*Cryptopus senegalensis* was described from a very young specimen in the Paris Museum before it had any of the sternal callosities developed. The specimen of *Trionyx*, with flaps over its feet, which we have received from the same locality, is unfortunately in the same condition; and though it affords very good evidence that it is destitute of any bones on the margin of the shield, and therefore does not belong to the same genus as the Asiatic animal with which M. Duméril associated it, yet it does not give us the means of knowing to which, if to either, of the two African forms, viz. *Cyclanosteus* and *Aspidochelys*, it should be referred.

The description of Duméril, and the colouring of the head, &c. of the specimen in the Museum, show that it must be distinct from *Cyclanosteus frenatus* and from *Cryptopus Aubryi* (which may be

synonymous), as it has small white dots on its head, while *C. frenatus*, as its name implies, and *C. Aubryi*, as its figure shows, are not spotted, and have black lines on the side of the head and neck.

*Cyclanosteus Petersii* and *Aspidochelys Livingstonii* have been described from shells of adult animals only, without any remains of the bodies attached to them; so that it is not possible to know whether either of them be the adult form of *Emyda senegalensis*, or what is the colouring of their head, which is a very distinctive character in the animals of this family.

*Cyclanosteus frenatus* is known only from a note which Dr. Peters sent home in 1848, shortly after his return from Mozambique.

*Cryptopus Aubryi* is well described and figured by M. Duméril in the Rev. Zool. for 1856, p. 374, t. 20, and it appears to be very nearly allied to the shield which I have lately described and figured in the 'Proceedings' of the Society, under the name of *Aspidochelys Livingstonii* (A. N. H. p. 68); but we cannot be certain that the animal from Gaboon and that from Mozambique are identical, until we know what are the peculiarities of the head of the Mozambique species. I may state that Mr. Cope, in the 'Proceedings of the Academy of Natural Sciences of Philadelphia' for 1859 (p. 295), has formed M. A. Duméril's species into a genus, under the name of *Heptathyra*, in which he evidently intended to include my genus *Aspidochelys*. As his paper was read in 1859 and mine in 1860, his name ought to have priority, unless it should be found desirable, as there is a considerable difference between them in the form of the sternal callosities, to preserve both the names.

The African species known in their adult stage may be arranged thus:—

A. *Sternal callosities 9; hinder pair small.*

1. CYCLANOSTEUS. The hinder pair of callosities very small, and far apart.

*C. Petersii*, Gray, Cat. Tortoises, B.M. 65. t. 29. Gambia.

B. *Sternal callosities 7; hinder pair large.*

2. HEPTATHYRA. The hinder pair of callosities rhombic, united together by their whole inner edge.

*H. Aubryi*, Dum. Rev. Zool. 1856, 364. t. 20.

Neck with three black streaks, the lateral ones from the eye; occiput with two short black streaks. Gaboon.

3. ASPIDOCHELYS. The hinder pair of callosities oblong, united by their hinder edge only.

*A. Livingstonii*, Gray, P. Z. S. 1860, 6. t. 22. River Zambesi.

The only specimen of the Senegal species yet known to me is very young; it does not show the sternal callosities, and has still remains of the umbilical slit. It may be described as follows:—

EMYDA SENEGALENSIS, Gray.

*Cryptopus senegalensis*, Dum. & Bibr.

In spirits. Grey; beneath, white. Head above with many symmetrical roundish white spots, and a short white streak in the centre of the crown; upper part of the neck with symmetrical white marbling. Upper shell grey, with small round scattered black spots, with a distinct central keel, which is rather broad and smooth in front, becomes suddenly narrow, and is converted into a series of close tubercles at the middle of the back. Back with rather irregular, often interrupted, somewhat concentric lines of small tubercles, which converge towards the central keel behind, and with a number of larger, isolated, but rather crowded tubercles on the middle of the front edge; sternum blackish, white on the margin.

*Hab.* Senegal.

#### ON NEW REPTILES AND FISHES FROM MEXICO.

BY DR. ALBERT GÜNTHER.

A collection of Reptiles and Fishes made by one of the correspondents of M. Sallé in Mexico, and purchased for the British Museum, contains, besides many other scarce species—as *Cubina grandis*, Gray, *Gerrhonotus imbricatus* and *tessellatus*, Wiegmann, *Geophis (Catoctoma) chalybæa*, Wagler (scales keeled), *Conopsis nasus*, Günther, *Zamenis mexicanus*, D. & B., *Atropus undulatus*, Jan, &c.,—the following new species.

#### SAURIA.

##### MABOUIA BREVIROSTRIS.

*Diagnosis.*—The snout (from the anterior margin of the eye) is a little shorter than the width between the orbits. Twenty-four longitudinal series of scales round the middle of the trunk, two entire and two half series along the back between the white streaks. Two large anal shields in front of the vent, with a small additional one on each side. A series of large shields along the lower part of the tail. Back brown, separated from the sides, which are black, by a white streak, running from the snout, above the eye, to the origin of the tail, where it is gradually lost. Another streak, less distinct, borders the lower lip, and the black coloration of the side. Belly whitish, the centre of each scale being minutely dotted with greyish.

*Hab.* Oaxaca (Mexico).

The general arrangement of the shields of the head being the same as in *Mabouia agilis*, it does not appear necessary to give a detailed description of them. The present species is very similar to the latter, but distinguished by a considerably shorter snout. The large scales on the back and the large anal shields are sufficient characters to distinguish it from *M. Lacepedii*, &c.

#### OPHIDIA.

##### LEPTODEIRA DISCOLOR.

*Diagnosis.*—Anal bifid; scales in nineteen rows. Posterior maxil-

lary tooth longest and strongest, in a continuous series with the other teeth, not grooved. Dirty-white, with numerous black cross-bands extending on to the ventral plates; belly uniform whitish.

*Hab.* Oaxaca (Mexico).

*Description.*—The head is rather broad and depressed, the snout rounded; the eye is of moderate size, its vertical diameter being about one-third the width between the eyes; the trunk is rounded, and, like the tail, somewhat slender. The rostral shield reaches just to the upper surface of the snout; the frontals are nearly square: the anterior pair are one-third the size of the posterior, which are slightly bent downwards to the side of the head; the vertical is pentagonal, longer than broad; the occipitals rounded posteriorly. Nostril situated between two nasals; loreal quadrangular; one anterior and two posterior oculars; seven or eight upper labial shields, the third and fourth or the fourth and fifth entering the orbit. There is one elongate temporal shield in contact with both the oculars; the other temporals, five in number, are scale-like. The medial lower labial is triangular and rather small; nine lower labials, the first of which is in contact with its fellow behind the median shield. There are two pairs of chin-shields, of nearly equal size. The scales are in nineteen rows, smooth, rhombic, those of the sides similar to those on the back. The number of the ventral plates varies between 182 and 179, that of the caudal between 88 and 87.

The ground-colour of the upper parts is dirty-white: the upper part of the head is brown; there is a whitish collar behind the occipitals. Fifty-one or fifty-four black bands cross the trunk and extend on to the edge of the belly; they are broader than the interspaces between, and become interrupted and spot-like on the tail. All the lower parts are uniform whitish.

	in.	lin.
Total length . . . . .	21	1
Length of the head . . . . .	0	7
Greatest width of the head . . . . .	0	5 $\frac{1}{3}$
Length of the trunk . . . . .	14	6
— of the tail . . . . .	6	0

This species might be easily taken for a variety of *Leptodeira annulata* or *Leptodeira torquata*\*, exhibiting nearly the same physiognomy, and externally differing only in its more slender body; fewer scales, and somewhat modified coloration. Nevertheless we should be obliged to refer these snakes to different genera, if we were to adopt the dentition as the chief systematic principle: namely, *L. annulata* to *Dipsas*, *L. torquata* to *Liophis*, and *L. discolor* to *Coronella*.

### PISCES.

CHROMIS NEBULIFERA, sp. nov.

D.  $\frac{13}{12}$ . A.  $\frac{6}{9}$ . V. 1/5. L. lat. 35. L. transv. 6/13.

Mouth narrow, protractile; teeth of the jaws cardiform, in a short

\* Ann. & Mag. Nat. Hist. March 1860, p.169, pl. x. fig. A.

band, those of the outer series larger, somewhat compressed, brown at the tip; palate smooth. Opercles scaly; præopercular margin entire. Nostril simple.

The height of the body is contained three times and one-half in the total length, the length of the head four times and two-thirds. The interorbital space is convex, and its width rather more than the diameter of the eye, which is one-half the length of the snout. There are six series of small scales between the præorbital and the angle of the præoperculum. The dorsal fin and the lateral line commence on the same vertical; caudal truncated; the commencement of the anal falls vertically below the sixteenth dorsal spine; the ventral is inserted behind the pectoral, and extends on to the vent. Greenish, the middle of the body clouded with blackish, in form of indistinct vertical bands; a round black spot at the root of the caudal; the outer parts of the fins blackish.

This species would be placed in the genus *Heros* of Heckel.

*Hab.* Fresh waters of Mexico.

	in.	lin.
Total length . . . . .	7	0
Height of the body . . . . .	2	0
Length of the head . . . . .	1	6
Diameter of the eye . . . . .	0	3½

*CHROMIS FENESTRATA*, n. sp.

D.  $\frac{17}{12}$ . A.  $\frac{6}{9}$ . V. 1/5. L. lat. 33. L. transv. 6/13.

Mouth narrow, protractile; teeth of the jaws cardiform, in a short band; those of the outer series larger, somewhat compressed, brown at the tip; palate smooth. Opercles scaly; præopercular margin entire. Nostril simple.

The height of the body is contained two and three-fifth times in the total length; the length of the head four times. The interorbital space is convex, and its width more than the diameter of the eye, which is one-half the length of the snout. There are five series of scales between the præorbital and the angle of the præoperculum. The dorsal fin and the lateral line commence on the same vertical; caudal truncated; the commencement of the anal falls vertically below the fifteenth dorsal spine; the ventral is inserted behind the pectoral and extends on to the anal. Blackish-green, with six black vertical bands, crossing a deep black longitudinal band, which runs from above the pectoral to the root of the caudal. Vertical and ventral fins blackish, darkest at the base and margins.

This species would be placed in the genus *Heros* of Heckel.

*Hab.* Rio de la Lana (Mexico).

	in.	lin.
Total length . . . . .	3	8
Length of the head . . . . .	0	11
Height of the body . . . . .	1	5
Diameter of the eye . . . . .	0	2½

TETRAGONOPTERUS AENEUS.

D. 11. A. 26. V. 8. L. lat. 35. L. transv. 7/6.

The height of the body is contained three times or three and a half times in the total length, and the length of the head four and four-fifth times. The interorbital space is convex, and its width more than the diameter of the eye, which equals nearly the extent of the snout. Uniform bronze-coloured, with a brownish spot at the root of the caudal.

*Hab.* Fresh waters of Oaxaca (Mexico).

	in.	lin.
Total length.....	3	5
Height of the body.....	1	1
Length of the head.....	0	8½
Diameter of the eye.....	0	2¼

June 26, 1860.—E. W. H. Holdsworth, Esq., F.L.S., in the Chair.

ABSTRACT OF NOTES ON THE OSTEOLOGY OF *BALÆNICEPS*  
*REX*. BY W. K. PARKER, MEMB. MICR. SOC.\*

The first view of the living *Balæniceps* at once suggests the idea of the Boatbill (*Cancroma*), the Heron (*Ardea*), and the Adjutant (*Leptoptilus*). Other large-headed birds occur to the mind on a longer observation; for one instinctively thinks of the Pelican (*Pelecanus*), the Toucan (*Ramphastos*), the Hornbill (*Buceros*), and the *Podargus*, although these birds belong to distinct and very remotely related groups. Nor does the internal structure of this noble but strange and weird-looking bird contradict the first external impressions; for the very unusual size of the head, and its great strength, require certain modifications of a teleological character, such as occur in the large-jawed species of other widely separated groups. The difference in the structure of the skeleton between the *Balæniceps* and its small New World relative, the *Cancroma cochlearia*, is greatly exaggerated by the necessary modification of the bones in the giant species, by their thickness, and by the size of the ridges and out-standing processes for muscular attachment; but the two birds are, nevertheless, near allies. In the skull, especially, is this difference exhibited; and any large bird may differ osteologically from its small relations from this cause, much more than from any necessary specific or generic distinction of character.

Again, any peculiarity of habit in an aberrant species, or genus, will make, as it were, large demands upon the structure of those parts or organs which are subservient to this (as it regards the group or family) eccentric mode of life. The Secretary-bird (*Serpentarius*) amongst the Vultures, the Spoonbill (*Platalea*) and the Oystercatcher (*Hæmatopus*), the Pelican and the Scissors-bill (*Rhynchops*), each form so different from its relations, are familiar instances of this law.

\* This paper will be printed entire in the 'Transactions,' accompanied by illustrative plates.



Perhaps we ought to expect the skull of a bird to be the seat of more extensive teleological modifications than any other part of the skeleton, seeing that it must perform such varied duties, learn so many trades, and be the servant and caterer to the whole body; whilst the hands, which in some of the higher mammals minister to the necessities of the creature, are here necessarily restricted to one or two functions. If a rule like this could be clearly made out, it would go far towards settling many a disputed point of relationship; the Hornbills and the Kingfishers would not then startle the student of the Insectores; and the Flamingo (*Phœnicopterus*), notwithstanding its lamellirostral character, might be allowed to stalk amongst the Herons.

The broad expanded occiput of the *Baleniceps* differs but little from that of the Adjutant; but the upper surface of the skull, instead of being generally rough and convex, as in the latter bird, is smooth, flat, and even concave at its anterior half. In the *Baleniceps*, as in the Heron and Boatbill, the large eye-ball has elevated the upper orbital margin above the level of the mesial part of the skull, whilst in the Adjutant that margin is some distance below. Moreover, the skull of the *Baleniceps* is very short as compared with that of the Adjutant, and in density and polish of the bone is more like that of the great Maccaws (*Ara*); its transverse hinge, too, with the upper jaw-bone, is more like that of these birds than that of its own congeners. There is no bony bridge over the temporal fossæ in this bird, in which respect it agrees with the Heron and Boatbill, and differs from the Adjutant. The eye-ball being very large and the skull very short, the anterior orbital margin is one-third of an inch in front of the great transverse hinge; whilst in the Adjutant, and even in the Heron, it is half an inch behind that hinge. This modification has caused a displacement of the lacrymal bones, which, although they form the anterior boundary of the orbit, as in other birds, are in front of the great hinge, instead of behind it. The nostrils are high up on the jaws, two-thirds of an inch in front of the hinge, and more than one inch apart; at their anterior end they are continuous with the deep submesial grooves that mark out the strong bony ridge of the upper jaw, and pass forwards to mark the boundary of the great terminal beak. On the mid-line, a little behind the nasal fossæ and in front of the hinge, the upper jaw-bone rises into a rough boss.

Now in most birds the highest part of the upper jaw is between the nasal fossæ, and not behind as in the *Baleniceps*. This character, with the backward extension of the jaw, the shortness of the frontals, and the very forward position of the enormous well-margined orbits, helps to give a solemn, wise, but somewhat sinister aspect to the bird. Looking at him in his paddock, the first impression is that we have before us some strangely ancient form with "the breath of life" in it, and "standing upon its feet," concerning which geology had taught us that "its bones were dried up, and its hope lost."

The marginal outline of the great upper jaw of the *Baleniceps* much resembles that of the leaf of *Magnololia grandiflora*. Its length is more than twice its breadth; whilst in the Boatbill the breadth

is more than half the length, the upper jaw of the latter being more outspread. The degree of arching of the upper jaw is intermediate between that of the Boatbill and that of the Stork (*Ciconia*). The gradual rise of the mesial ridge to form the great terminal hook, the crescentic notch forming the inferior margin of that beak, and then the graceful outward curve of nearly the entire mandibular margin, give great elegance to the lateral aspect of the upper jaw. At the end of that margin we have the commencement of the great cheek-bone, which is nearly two inches long, half an inch broad, and one-quarter of an inch thick.

Such a magnitude of the zygomatic arch as this is perfectly unique in the class of Birds, being more like the development of the same part in most Mammalia, in the Crocodiles, and in the Turtles. In the enormous heads of the larger Hornbills, the cheek-bones are not half the size they attain in the *Balæniceps*.

The os quadratum, or tympanic bone, which forms so beautiful an articular medium between the cranium and lower jaw in birds, is strong and well-developed. This bone and the little pterygoid, which intervenes between it and the palatines, have very much the character of the same bones in the Heron and the Adjutant; but the palatine bones themselves, coalescing at the mid-line, and sending downwards a strong keel at that part, are exactly intermediate in structure between those of the Adjutant and Pelican. These bones and the pterygoid at their point of junction are beautifully scooped out to receive and glide under the strong beam of bone which forms the base of the interorbital septum.

The great strength of all the bones forming the upper maxillary apparatus is in perfect harmony with what is known of the habits of the creature. In this respect it has no peer amongst its congeners, and no superior except amongst some of the larger Parrots. But the latter birds, although they possess the most perfect fronto-maxillary hinge, have nothing in their tympanics, or malar bones, at all comparable to those of the *Balæniceps*. Perhaps the most elegant part of this bird's structure is the hard palate, formed for the most part by the coalesced premaxillary bones,—the maxillaries in birds, as in typical fish, having a very backward position and often inferior development. The mid-line of this highly arched hard palate is occupied by a partially open canal for a large venous sinus, which receives on either side numerous vein-grooves at right angles. This gives a beautiful leaf-like appearance to this structure.

Just inside the margin of the posterior angle on the under surface of this great upper jaw the bone is cut away, as it were, to receive the coronoid portion of the lower jaw. This excavated part is continuous anteriorly with a deep groove, margined internally by a sharp ridge, which gradually rises inside the palate to pass forwards in a sigmoid manner to the base of the great terminal beak, where it meets the submesial groove on the upper surface of the jaws. In the Common Heron these palatine submarginal lines exist, being covered in the horny sheath by sharp ridges. These ridges have their fullest development in the Green Turtle. The occipital condyle is

hemispherical and large ; and the base of the skull has a very exquisite structure, which deserves full description, as it exceeds anything we have seen in birds, the Heron making the nearest approach to the *Balæniceps* in this particular. Many other birds, however, show traces of this peculiar structure. The lower jaw is exceedingly strong and thick, as compared with that of the Adjutant. Less elliptical and more triangular than that of the Boatbill, it has, nevertheless, many of the characters of the latter. Its tip is curiously emarginate, as is also the tip of the upper jaw—the bony basis of the great hooked beak. The traces of suture between the dentary and other elements of the mandible, which are persistent in the Boatbill, Adjutant, and most other birds, are all filled up with bony matter, as is the case in the Parrot tribe, in the Hornbills, and in the Toucans. The anterior part of the mandible passes within the maxilla, the edge of its horny sheath fitting between the marginal and submarginal ridges of the latter. Where the upper jaw begins to narrow towards its angle, there the mandible rises high (its height or depth here being  $1\frac{1}{3}$  inch), and it is rounded, rough, and strong. It then lowers again, and becomes rapidly broader, to form the deep and wide articular cavities for the tympanic bone above, and the broad flat angular processes behind and below.

Each ramus of this great *inelastic* mandible is united to its fellow at the symphysis by complete bony union to the extent of  $1\frac{1}{3}$  inch. In the extremely *elastic* mandible of the Pelican this line of bony union is one-eighth of an inch in length, in the Boatbill one-fourth of an inch, in the Adjutant  $4\frac{1}{2}$  inches, and in the Hornbill, *Buceros bicornis*, more than 7 inches.

In the Boatbill and Grey Heron there are twenty-three separate vertebræ between the head and the pelvis ; in *Balæniceps rex* and the Adjutant twenty-one, and in the White Stork twenty.

In the Boatbill there are nine pairs of free ribs. The last, or pelvic, does not reach the sternum, nor do the first four ; so that there are four true dorsal ribs. In the Heron there are eight pairs ; the anterior three and the last (which is pelvic) do not reach the sternum : here there are only four true dorsals. The *Balæniceps*, the White Stork, and the Adjutant have each seven pairs of free ribs, the last five reaching the sternum ; in *Balæniceps* and the Adjutant the last pair are pelvic ; in the White Stork the last two pairs. Until the birds are adult, the anterior vertebræ of the pelvis are but partly united. In the Storks, Herons, Boatbill, and *Balæniceps* the dorsal vertebræ continue distinct throughout life ; but in many of the Cranes the tendons of the dorsal muscles are ossified, and fasten the bones more or less together, and two or three contiguous centra coalesce. Among the cervical vertebræ of the true Herons and their nearest allies, *e. g.* *Ardea*, *Botaurus*, *Cancroma*, and *Balæniceps*, there are several which have elegant bridges under their upper or cranial end for the carotid arteries, which bony bridges are not true hæmal arches, but are formed by exogenous processes\*. In these ver-

\* See Prof. Owen's article in Orr's 'Circle of the Sciences,' entitled "Structure of the Skeleton and Teeth," p. 182, fig. 10. iv.

tebræ there are four canals—the one under consideration, one for the spinal chord, and a pair for the vertebral arteries. In the *Balæniceps* the vertebræ, from the seventh to the thirteenth inclusive, are thus constructed. The only *Stork* in which we have seen this structure is the Australian Jabiru, *Mycteria australis*; for a knowledge of which fact we are indebted to the kindness of Mr. Edward Gerrard. These pairs of inferior processes meet together in but few birds; nevertheless this is the case in the White Pelican (*Pelecanus onocrotalus*) and in the Gannet (*Sula bassana*). In the former bird also there is no cup-and-ball articulation of the dorsal vertebræ, which reptilian character occurs in the Gannets, Cormorants, and Penguins. Notwithstanding their great size, the vertebræ of *Balæniceps* agree better with those of the Heron than with those of the Stork; but in their shortness, better with those of the Boatbill than with those of the longer-necked Heron: for the Heron, like the Giraffe, gains its great length of neck by elongation of the individual vertebræ rather than by an increase in their number. The ribs of the *Balæniceps* are lighter, weaker, and more cellular than those of its congeners. The oblong, narrow, neat pelvis of this bird is more like that of the Boatbill than that of the Stork, or even of the Heron. It differs, however, from that of either of these in not being expanded in a broad foliaceous manner over the top of the posterior ribs. This part again agrees with the pelvis of the Heron, inasmuch as the ischium passes much further backwards than the posterior part of the ileum. In *Ciconia alba* these two pelvic bones terminate in the same vertical line, whilst in the Adjutant and Boatbill the ileum projects backwards and furthest. The pubic bones are unusually broad. There are seventeen sacral vertebræ, the first of which has a pair of ribs. The caudal vertebræ are six in number, the last being composed of eight or ten embryonic vertebræ.

The sternal apparatus of this bird is very interesting. In shape the sternum is intermediate between that of the White Stork and that of the Cormorant, the keel, as in the latter bird, projecting evenly forwards anterior to the articulations with the coracoids, for a greater distance than in the Stork and Heron. Moreover, the keel is not quite so deep as it is in the congeners of this bird. It passes, however, to the end of the sternum, as in them; whereas in the Pelicans, Gannets, and Cormorants it scarcely continues beyond the middle of that bone. The episternal process is obsolete in this bird; it exists in the *Pelecanidæ*, Herons, and Boatbill, and is nearly obsolete in the Storks. The hyposternal processes are unusually long and arcuate; and there is on each side of the end of the keel another rather smaller emargination which is obsolete in the Storks, Herons, and Boatbill, but is well shown in the Spoonbill and the *probing* waders, *Numenius*, *Himantopus*, *Limosa*, &c. The tips of the furculum are subtriangular and rather flat; the bone then becomes very thick and trihedral, having at the top of the thick part a large oval facet, which is adapted to the under part of the head of the coracoid. This thick part is very short, for the bone suddenly lessens, bends backwards, and passes on, rounded below and angular above, to thicken again at

the angle, where it makes a most complete ankylosis with the tip of the sternal keel. This structure of the furculum is similar to what is found in *Pelecanus*, *Phalacrocorax*, and *Sula*; but we have seen no such "merry-thought" bone in any Ardeine bird. In these, as in *Balæniceps*, the rami of the bone are not only flat as they pass in between the heads of the coracoids, but this thin condition of the bone is continued throughout one-half of their extent. They have no such sudden bend at the upper third, the arch being gentle, and the lessening size of the bone gradual. Nevertheless, in the Boatbill there is a slight tendency to this state of things. The blending of the furculum with the sternal keel seldom takes place in the true Herons and Storks; there continues even in old birds a synovial gliding joint, and in the Boatbill and some of the smaller Herons the furculum does not quite reach the sternum. This articulated condition is generally found in Gannets and Cormorants; but in old Pelicans ankylosis of the joints takes place. This occurs too in the Secretary bird, which is unique among the birds of prey in having a joint there at all, so that this last-mentioned bird is a raptorial isomorph of the Cranes. In the latter birds (the *Gruidæ*) there is great difference in the structure of these parts; for whilst in such species as *Grus Antigone* and *G. americana* we have in the adult bird complete coalescence, in the Balearic Crane, *G. pavonina*, and in the Trumpeter, *Psophia* (a Crane becoming slightly gallinaceous), the furculum does not reach the sternum at all.

Any lengthy remarks upon the bones of the limbs need not be made at present. They are about three-fourths the size of those of the Adjutant; but as the limbs had not enjoyed much liberty of exercise, they have not that robustness which is seen in the skeleton of old wild birds. The humerus is longer relatively, and the forearm shorter in proportion than in the Adjutant; the thigh-bone is longer in proportion to the tibia and tarso-metatarsus in the *Balæniceps* than in its larger relation. The toes are very long, reminding one of those of the Jaçanas (*Parra*); and the most ridiculous care which this stilted, stalking bird takes, both in taking up and setting down its feet, makes it worth while to compare the length of the bones of its toes with that of the bones of the toes of the Great Adjutant.

	Hallux.	Inner toe.	Middle toe.	Outer toe.
	in.	in.	in.	in.
Adjutant . . . . .	2·3	4·15	5·7	4·7
Balæniceps . . . . .	3·3	3·8	6·5	6·4

To conclude, I may remark that upon a careful examination of the osteology of the *Balæniceps*, after eliminating the teleological from the relational characters, I am decidedly of opinion that it is strictly an Ardeine bird, and more nearly related to *Cancroma* than to any other known type.

*Note I.*—Amongst the bones of the limbs, the humerus alone is pneumatic,—the cavity of the os femoris being filled with medulla, as are all the more distal bones.

*Note II.*—The tongue is extremely small—an important *Pelecanine* character.

ON A NEW FORM OF GRALLATORIAL BIRD NEARLY ALLIED TO THE CARIAMA (*DICHOLOPHUS CRISTATUS*). BY DR. G. HARTLAUB, FOREIGN MEMBER.

Professor H. Burmeister of Halle, who has lately returned to Europe after an absence of about three years in the southern portion of South America, has communicated to me the following notice of a new species of Grallatorial Bird, very nearly allied to the *Cariama*, which he met with in the woody parts of the Argentine Republic, and which I have the pleasure to name after him *Dicholophus Burmeisteri*.

This discovery is the more important and interesting, inasmuch as the *Cariama* has, until now, remained rather an isolated type, widely separated from even its nearest relatives.

The *Chunga*, as this bird is called by the Spanish inhabitants of the Republic, seems to differ subgenerically from *Dicholophus* in the following points:—The lores are equally and thickly plumose; there is no conspicuous frontal crest; the tail is comparatively longer, and the tarsus comparatively shorter; the nails are nearly uniform on all the toes, and are stronger, larger, and more curved than in the *Cariama*. A very important difference, perhaps the most important, consists in the totally different habits of the more northern representative. Professor Burmeister proposes for it a subgeneric division, under the name of *Chunga*.

The *Chunga* is a large bird, of about 29 inches in length; it is found in the wooded districts of the province of Tucuman and Catamarca; it nests on the ground. Its eggs are white, slightly spotted with rufous. It feeds upon insects, and more especially upon locusts. The young have a rufous dress, thickly undulated with black: they very soon begin to take care of themselves. The *Chunga* is easily domesticated, and seems, even after a few days of captivity, attached to its master. Professor Burmeister saw two of them on a farm, which were of the size of an *Ædicnemus*, and still bore their downy plumage. They were fed upon little morsels of beef, but rejected larger pieces, as well as the entrails of fowls. They delighted in collecting bones, which they were in the habit of striking upon a stone and breaking to pieces. During the day they stalked gravely about, visited the house, jumped upon the tables and chairs, always collecting food, and slept at night at certain elevated stations, for instance on the projecting roof of the verandah. Professor Burmeister obtained a living bird at Catamarca, and observed it for some length of time. He saw it for the first time at the foot of the Sierra de Aronguiga, where it ran very quickly and shyly over the road and disappeared in the forest. In its wild state it is very difficult to kill; therefore it is preferable to search for the nest, and bring up the young birds by hand. The cry of this bird is heard very frequently in the district where it is found; it resembles that of the *Dicholophus cristatus*, and sounds like the bark of a young dog, but not quite so loud. The internal structure is quite the same as that of *Dicholophus*.

*DICHOLOPHUS BURMEISTERI*, Hartlaub.

*Statura et ptilosi ut in D. cristato; crista frontali vix ulla.*

*Totus pure cinereus, singulis plumis annulis alternantibus albidis et nigrescentibus tenuissime notatis; striga supra-oculari a loris inde ad aures usque producta alba; epigastrio pallidior; abdomine imo crisso et cruribus flavescenti-albidis; remigibus nigro-fuscescentibus pogonio interno ferrugineo-fulvescente fasciatis; cauda dorso concolore, distinctius transversim lineolata; rectricibus duabus intermediis unicoloribus, reliquis fasciis duabus latis nigris ante apicem notatis, omnibus subtus pallidioribus; rostro et pedibus nigris; iride obscure grisea.*

Long. tot. circa 28"; rostr. a nar. 13<sup>'''</sup>; al. 12"; caud. 10"; tars. 5" 2<sup>'''</sup>; dig. med. 2"; dig. int. 1" 3<sup>'''</sup>; dig. ext. 1" 5<sup>'''</sup>; pollic. 7<sup>'''</sup>.

#### REMARKS ON THE ANAS (ANSER) ERYTHROPUS OF LINNÆUS.

BY ALFRED NEWTON, M.A., F.Z.S.

The determination of the species established by Linnæus has always been held by naturalists a matter of so great importance, that I have no scruple in occupying a portion of your time this evening with a few remarks respecting the bird which, in the 12th edition of his 'Systema Naturæ' is designated by the name of "*Anas erythropus*;" especially also as one of his editors (the late learned Professor Retzius), though noticing the "mira circa hanc avem confusio," has, in my opinion, failed to give a satisfactory solution of the difficulty. It will be, I think, universally admitted that the names employed by Linnæus, when, as in the present instance, they are drawn from any physical character, are remarkably apposite. This consideration of itself should have served as a warning to ornithologists against their imagining, as many have done, that he could possibly mean to apply the name "*erythropus*" to a species like the Bernicle Goose, with which he was sufficiently familiar, and to which it was in no degree suitable.

It will, perhaps, be convenient to examine first on what foundation "*Anas erythropus*" was established.

In the 12th edition of the 'Systema Naturæ' (Holmiæ, 1766) we find (vol. i. pars 1. pp. 197-8) the species as the eleventh in order of the genus *Anas*, and the account given is:—

"A. cinerea, fronte alba. Faun. Svec. 116." [I omit all the synonyms borrowed from other authors.] "Rostrum rubrum. Pedes rubri."

Now these latter characters clearly can have no reference to the Bernicle Goose, even if that species were not elsewhere included as *Anas bernicla*, var.  $\beta$ .

Turning then to the edition of the 'Fauna Suecica' cited (Stockholm, 1761), we have (p. 41) as follows:—

"116. ANAS *erythropus* cinerea; fronte alba. Fn. 92. . . . .  
Anser cinereus ferox, torque inter oculos et rostrum albo, erythropus. W. Botniensibus Fjæll-gås. Habitat in Helsingia, Lapponiæ alpebus."

To this succeeds a description of the male, which I admit is open to objection; but the matter, in my opinion, is rendered conclusive by the description of the female, which, in the edition of the 'Fauna Suecica' here referred to, and published fifteen years previously (Lugd. Bat. 1746), is alone given. It is this:—

"Rostrum sordide carneum, frons alba. Caput, collum, dorsum,

cauda cinerea; pectus et abdomen candida: maculae in sterno nigrescentes: Pedes sanguinei."

It is therefore plain that by *Anas erythropus* Linnæus did not intend to designate the Bernicle Goose, but a bird known in his time to the Swedes of Westro-Bothnia by the name of Fjæll-gås—i. e. "Fell" or "Mountain Goose." It accordingly remains to be seen what that species is.

It appears by the note-books of the late Mr. John Wolley, which are now in my possession, that in all his researches he was able to find only two species of Wild Goose inhabiting the extensive district in Lapland which he so carefully explored, and of which part was comprehended in the ancient province of Westro-Bothnia. These species are known to the Finns, who form the great bulk of the population, respectively as the "Iso-hanhi" and "Killio-hanhi," the former signifying "Great Goose," the latter "Mountain Goose." The Iso-hanhi he had several opportunities of identifying as the well-known Bean Goose (*Anser segetum*); the other he found, somewhat to his surprise, to be, not, as he had been told by Swedish ornithologists, the Bernicle Goose, but a bird of about that size, and at the same time closely resembling, in plumage and other physical characters, the White-fronted Goose (*Anser albifrons*). Not to extend the present remarks, I may state briefly that he was not able to discover that the Bernicle Goose was known to any of the inhabitants of the interior of the country,—a statement which is singularly corroborated by Mr. Dann's note communicated to Mr. Yarrell (B. B. iii. p. 73) in reference to the last-named species:—"A skin of this Goose was shown me by some Laps near Gillivara, who were ignorant of the bird, never having seen it before. It was shot at Killingsuvanda." Accordingly, in the Catalogue of his Eggs sold by Mr. Stevens in 1856, he stated, under the head of "*Anas albifrons*," that "this interesting bird is the proper Fjell-gas of the Swedes, which name has, however, been applied to the Bernicle in their works on Natural History. The Lapland specimens seem to be of the small-sized race, which has been named *Anser minutus* by Naumann." I must here take exception to part of Mr. Wolley's statement, some Swedish writers being quite aware that the "Fjæll-Gås" was not *Anser leucopsis*, as, for instance, Professor Zetterstedt, in the account of his travels in Lapland \* (vol. ii. p. 161).

In the Catalogue of his Eggs sold in the following year (1857), Mr. Wolley further identified "the only White-fronted Geese which breed in Lapland," with the *Anser finmarchicus* of Bishop Gunner, described in one of the notes (pp. 264-5) of Professor Leem's great work †, "as distinct from the larger White-fronted Goose."

I can only say that I entirely coincide with the views thus expressed by Mr. Wolley, while I also identify the "Killio-hanhi ‡" or

\* 'Resa genom Sweriges och Norriges Lappmarker, af Joh. Wilh. Zetterstedt.' Two vols. 8vo. Lund, 1822.

† 'Canuti Ieemii de Lapponibus Finmarchiæ Commentatio, una cum J. E. Gunneri notis, &c. &c.' Kjöbenhavn, 1767.

‡ In Europæus's "Svenskt-Finskt Handlexikon" (Helsingfors, 1853), the word is spelled "Källio" (*vide page 42, sub voce* 'Berg.').



“Fjæll Gås,” with the *Anas erythropus* of Linnæus; and I here subjoin a concise summary of the principal synonyms of this bird.

*ANSER ERYTHROPUS* (Linn.).

*Anas* (*Anser*) *erythropus*, Linn. Syst. Nat. ed. 12 (1766), vol. i. pars 1. p. 197 (non Auct.).

*Anser finmarchicus*, Gunner, in Leemii de Lappon. Comm. notis (1767), p. 264.

*Anser Temminckii*, Boié, Isis, 1822, p. 882.

*Anser minutus*, Naum. Naturgesch. der Vög. Deutschl. (1842) vol. xi. p. 365, tab. 290.

### MISCELLANEOUS.

*Note on the Tetrapedos Smithii of Jan.*

By Dr. J. E. GRAY, F.R.S., V.P.Z.S., &c.

IN a recent Number of the ‘Archiv für Naturgeschichte’ (vol. xxv. p. 69, t. 2), a reptile from Ceylon is described by Prof. Jan of Milan, under the name of *Tetrapedos Smithii*: it is the same as *Evesia monodactyla*, described by me in the ‘Annals of Natural History,’ ser. 1. vol. ii. p. 336, in 1839, and in the ‘Catalogue of Lizards in the Collection of the British Museum,’ 1845, p. 127; and identical with *Evesia Bellii*, described by Duméril and Bibron, ‘Erpétologie Générale,’ vol. v. p. 783. Both these descriptions are from the same specimen, which was in the collection of Mr. Bell, and which he presented to the French Museum.

*Freshwater Polyzoa in Australia.*

By C. D’OYLY H. APLIN, Esq.

*To the Editors of the Annals and Magazine of Natural History.*

GENTLEMEN,—As I believe that up to this time the existence of freshwater Polyzoa in any part of Australia, or even in the southern hemisphere, is quite unknown to naturalists, I am gratified at being able to announce that within the last week I have found several specimens, comprising at least two species, each belonging to a different genus.

One is a *Plumatella*, with elongated statoblasts (free), closely resembling the figure of those of *P. emarginata* in Dr. Allman’s Monograph, pl. 7. fig. 7.

The other is unlike any figure in the above-named work.

Both were found adhering to the under surface of fragments of basalt, near the margin of a clear sheet of water occupying the site of a deserted quarry close to the river Yarra, at Richmond, about two and a half miles from Melbourne,—the former also adhering to the inner surface of the bark of a dead stump of *Eucalyptus*, in a lagoon in the Zoological Gardens near Melbourne.

They will both, I hope, be described and figured at an early date. In the mean time, I must content myself with this notice of their